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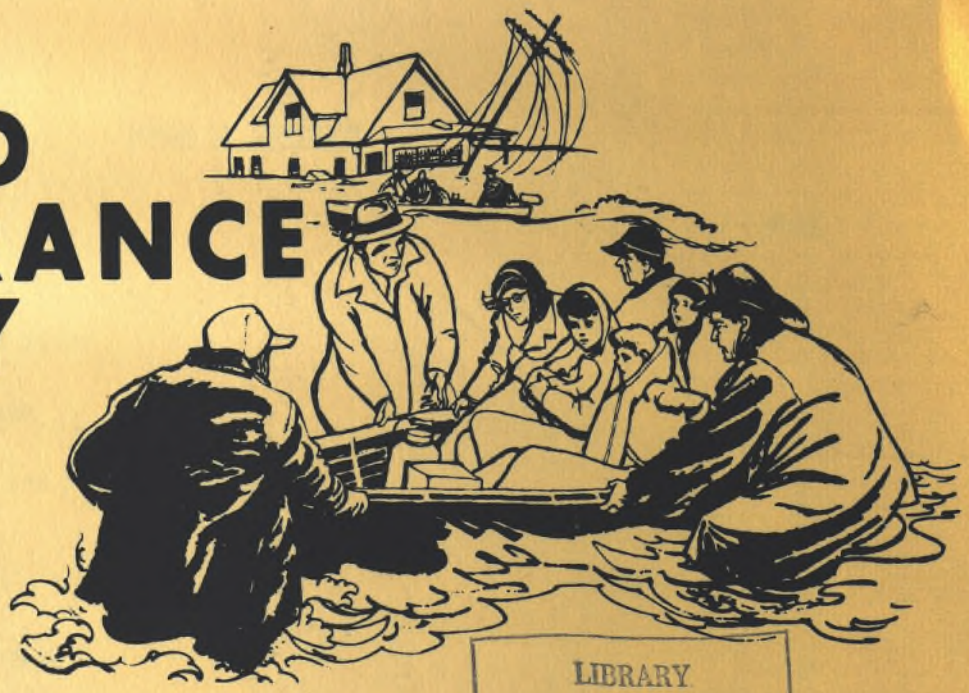
FLOOD INSURANCE STUDY



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TOWN OF WILSON, NEW YORK
NIAGARA COUNTY

AUGUST 1977

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

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FLOOD INSURANCE STUDY
TOWN OF WILSON, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Town of Wilson, Niagara County, New York, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of the information will be to convert the Town of Wilson to the regular program of flood insurance by the Federal Insurance Administration (FIA). Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

A series of meetings were held with representatives of the U. S. Geological Survey (USGS) and the U. S. Army Corps of Engineers (COE), local administrative officials, representatives of the study contractor, and other interested parties. The purposes of these meetings were to establish background information, analyze existing flood plain zoning, coordinate engineering efforts, and inform the community of study progress. A general information meeting was held on September 25, 1975, to acquaint the community with the purpose of the study and how it was to be performed.

Coordination meetings included discussion of the methodologies used for evaluating the hydrology of ungaged streams and discussion of available gaging station records. Technical assistance was furnished by the offices of the USGS in Albany and the COE, Buffalo District.

Contact with local authorities was maintained through the offices of the town clerk and the town supervisor.

A search for available basic data was made at all government levels. The office of the town supervisor provided various land use, zoning, and other municipal maps of the Town of Wilson.

Basin hydrologic data, as well as maps of flood-prone areas, were provided by the USGS office in Albany, New York.

On January 7, 1977, the results of this study were reviewed at a final coordination meeting attended by community officials, county officials, and representatives of the FIA and the study contractor.

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1.3 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by Parsons, Brinckerhoff, Quade, & Douglas under subcontract to Goodkind & O'Dea, Inc., for the Federal Insurance Administration under Contract Number H-3831. This work, which was completed in November 1976, covered all flooding sources in the Town of Wilson. Approximate flood boundaries were determined in May 1974 by Gannett, Fleming, Corddry, and Carpenter, Harrisburg, Pennsylvania.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Wilson; not included in this study is the Village of Wilson, which is contained entirely within the town. The area of study is shown on the Vicinity Map (Figure 1).

The limits of detailed study were approved by the FIA after consultation with the community and the study contractor. Areas studied in detail include Twelvemile Creek, East Branch Twelvemile Creek, Tributary East of East Branch Twelvemile Creek, Tributary South of East Branch Twelvemile Creek, and flooding along the Lake Ontario shoreline.

Flooding from several unnamed tributaries in the town was delineated by approximate methods. Areas studied in detail were chosen with consideration given to forecasted development and proposed construction for the next five years (through January 1982).

2.2 Community Description

The Town of Wilson is located in the northwestern part of New York State in northern Niagara County. It is bordered on the north by Lake Ontario, on the east by the Town of Newfane, on the west by the Town of Porter, and on the south by the Town of Cambria.

The Town of Wilson is a predominantly single-family residential community with a corporate area of about 64 square miles. The population is estimated by the town officials to be 4,100 persons. The

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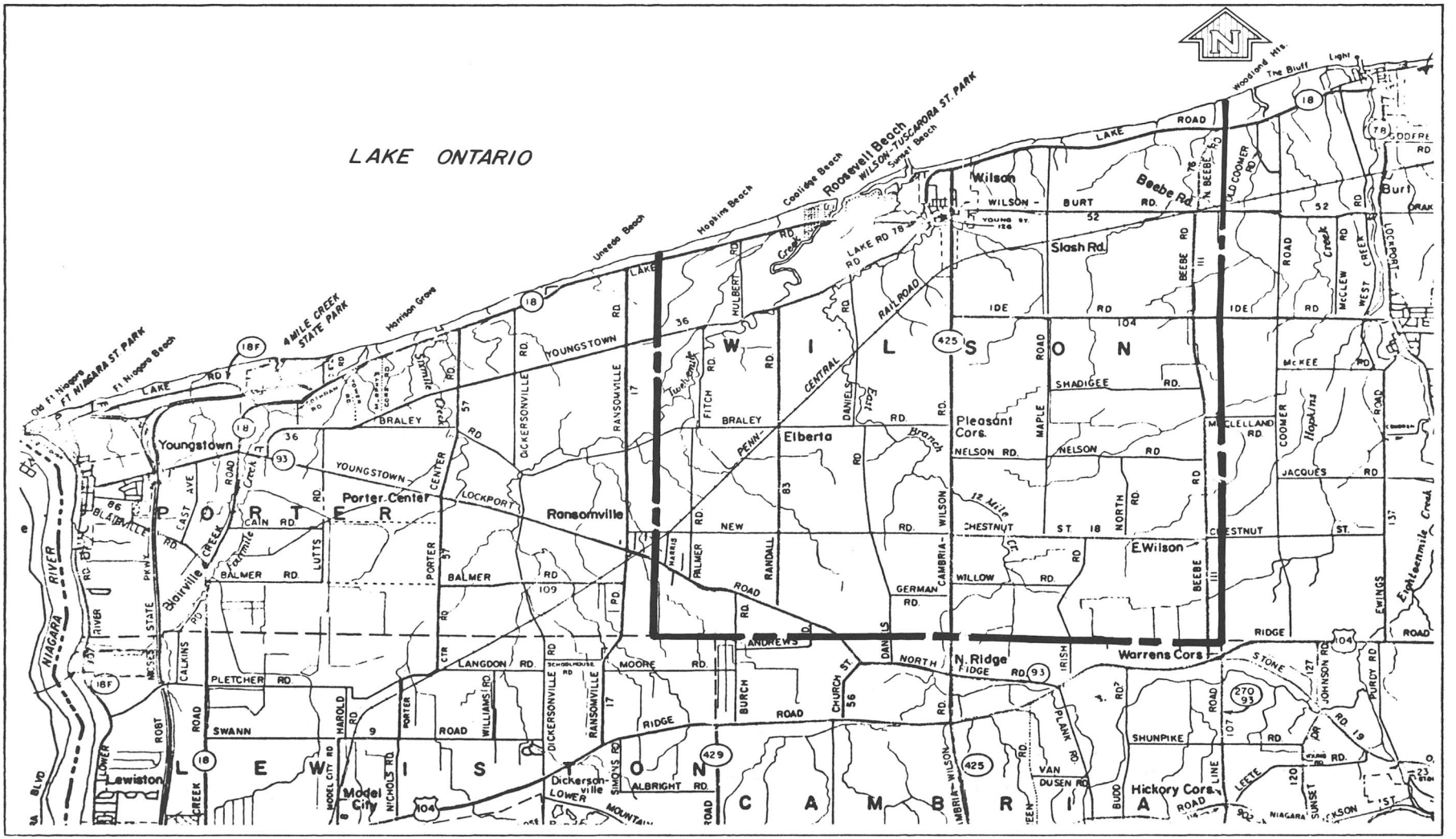

FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

APPROXIMATE SCALE
2 0 2 4 6 MILES

VICINITY MAP

topography of the town is relatively flat, rising about 140 feet in elevation from the lake shore to its southern boundaries.

The economy of the Town is predominantly agricultural, with numerous orchards.

East Branch Twelvemile Creek rises in the Town of Lewiston, south of Bond Lake, and then enters the Town of Cambria from its western corporate limits. After flowing through woodlands and orchards in Cambria, it crosses North Ridge Road before entering the Town of Wilson from its southern corporate limits. After it has crossed Willow Road, it is joined by its tributaries to the east and to the south. It continues to flow through woodlands, orchards, and marshlands, through Tuscarora Park and into Tuscarora Bay, and finally empties into Lake Ontario.

Twelvemile Creek also rises in the Town of Lewiston in the orchards just north of Swann Road. It then enters the Town of Porter along its southern boundaries. After flowing through woodlands and orchards, it enters the Town of Wilson. In the Town of Wilson it flows mostly through orchards and woodlands, and then enters the developed residential areas on the south and north side of Route 18 before emptying into Lake Ontario near Roosevelt Beach. There is very little development, either residential or commercial, within flood plain areas of the streams in the community.

A moderate climate prevails with an average annual precipitation of 30 inches and an average annual temperature of about 52 degrees Fahrenheit.

2.3 Principal Flood Problems

Flooding in the Town of Wilson occurs due to heavy rains resulting from localized thunderstorms, hurricanes, and high-water levels in Lake Ontario combined with high winds. Erosion along the lake shore has occurred due to wave action and high-water levels. In March 1973, flooding and erosion occurred inland along the banks of East Branch Twelvemile Creek. Flooding also occurred in July 1975. No peak elevations or frequencies are available for these storm events. According to information obtained from the supervisor of the Town of Wilson, there are only about one dozen properties situated very near the banks of Twelvemile Creek and East Branch Twelvemile Creek which are prone to flooding. From community officials it was learned that there is no major flooding problem due to these streams and, therefore, no high-water marks are available.

2.4 Flood Protection Measures

The Town of Wilson, recognizing the need for proper flood plain

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management, adopted the New York State Building Code and is endeavoring to enforce it as a flood protection measure.

As the town has not experienced any major flooding problem due to the streams studied in detail in this report, except for the inundation of mostly undeveloped low-lying areas whenever there are heavy rains, the community has no major plans for any structural flood protection measures.

Outflow from Lake Ontario is regulated by a power house and dam at Barnhart Island, New York. The lake is controlled according to Plan "1958-D," a plan which tries to anticipate high and low water levels according to seasonal fluctuations (Reference 1). The plan calls for seasonal adjustments of outflow to keep the lake level from 241.31 to 244.53 above the International Great Lakes Datum (IGLD = NGVD - 1.56 feet, where NGVD = National Geodetic Vertical Datum of 1929, formerly referred to as Sea Level Datum of 1929). Large long-term fluctuations of the lake sometimes make it difficult to maintain the desired range of levels for the lake. Due to the relationship of the large lake area to the limited discharge capabilities of out-flow streams, flood levels on the lake persist for a considerable time after the factors causing the high levels have diminished.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 50, 100 and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the drainage areas of the streams.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each stream studied in detail in the community.

In this study, the peak discharge-frequency relationships of nine USGS gaging stations on Cattaraugus Creek, Eighteenmile Creek, Smoke Creek, Buffalo Creek, Little Buffalo Creek, Cayuga Creek, Cazenovia Creek, and Scajaquada Creek (References 2 and 3) were first established using the standard log-Pearson Type III method, as recommended by the Water Resources Council (Reference 4). The

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lengths of record of these stations range from 11 to 35 years. The longest record is available from USGS Gage 0215000-Cayuga Creek near Lancaster, which has been operated since September 1938 with one year of missing flood records.

A set of regional flood-frequency curves was then established by correlating peak discharge and drainage area information of these gaging stations. The regional curves were also extended to cover watersheds with drainage areas less than 15 square miles. Since the Bureau of Public Roads method (Reference 5) is commonly used for estimating flood peaks of ungaged small watersheds in this region, this method was used to verify the validity of the extended curves. The peak discharges estimated from the extended regional curves check closely with the peak discharges estimated by the Bureau of Public Road's method.

The regional flood-frequency curves were then used to establish the discharge frequency relationship for the streams studied in detail, since all streams in the community are ungaged. The peak discharge drainage area relationships are presented in Table 1,"Summary of Discharges."

Analyses of elevations of Lake Ontario were based on records for the lake gages at Rochester (19 years), Oswego (74 years), and Cape Vincent (39 years) all on the United States side of the lake, as well as those at Port Weller (24 years) and Kingston (64 years) on the Canadian side. In 1975, the COE determined elevations for Lake Ontario based on elevation-frequency curves of the annual maximum flood levels recorded at each previously mentioned gage site, and adjusted to reflect present diversion and outlet conditions (Reference 6). The detailed investigation of the gage data included the statistical analysis of both the full record length and that portion of the record subsequent to the implementation of the most recent Great Lakes Regulation Plan. Comparison of the results of the analysis of the raw gage data with the COE analysis resulted in no significant differences, therefore, the COE 100-year flood levels were adopted for use in this study.

To establish the 10, 50, and 500-year flood elevations without the effect of wave run-up, an elevation-frequency curve was established using the 100-year elevations as determined above and a weighted mean (2-year) lake elevation of 247.43 feet NGVD obtained from gage records. The elevations of floods of the selected recurrence intervals are presented in Table 2, "Elevation-Frequency Data-Lake Ontario."

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TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TWELVEMILE CREEK					
At Lake Ontario	36.0	3,425	4,925	5,500	7,250
At Upstream Corporate Limits	25.5	2,715	3,925	4,375	5,850
EAST BRANCH TWELVEMILE CREEK					
At Lake Ontario	36.0	3,530	5,040	5,710	7,540
At Upstream Corporate Limits	17.3	1,975	2,850	3,200	4,275
TRIBUTARY EAST OF EAST BRANCH TWELVEMILE CREEK					
At Confluence with East Branch Twelvemile Creek	3.0	420	630	694	960
At Irish Road	2.3	380	570	630	880
TRIBUTARY SOUTH OF EAST BRANCH TWELVEMILE CREEK					
At Confluence with East Branch Twelvemile Creek	1.55	240	360	410	570
At Upstream Corporate Limits	0.67	135	200	220	315

TABLE 2 - ELEVATION FREQUENCY DATA - LAKE ONTARIO

LOCATION	STILL-WATER ELEVATION (ft. NGVD) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
Entire Shoreline of Town	248.3	248.8	249.0	249.4

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams studied in detail in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these streams.

Cross-section data for streams in the study area were obtained from aerial photographs; the below-water sections were obtained by field measurement. All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Cross-sections were located

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at close intervals upstream and downstream of bridges and culverts in order to compute significant backwater effects of these structures. In addition, cross-sections were taken between hydraulic controls wherever warranted by topographic changes. The locations of selected cross-sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

Roughness coefficients (Manning's "n") for the computations were estimated on the basis of field inspection of channel and overbank areas. For Twelvemile Creek, and East Branch Twelvemile Creek and its tributaries the roughness coefficients ranged from 0.04 to 0.05 for the channel, with a Manning's "n" of 0.15 for the overbank areas.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Water-surface elevations of floods of the selected recurrence intervals were developed using the COE HEC-2 computer step-backwater model (Reference 7). The starting water-surface elevation for Twelvemile Creek and East Branch Twelvemile Creek was based upon a 2-year flood frequency level of Lake Ontario. The starting water-surface elevations for the Tributary East of East Branch Twelvemile Creek were taken from the profiles for East Branch Twelvemile Creek. All elevations are referenced to NGVD; elevation reference marks used in this study are shown on the maps.

The ultimate water levels for Lake Ontario were determined by adding the dynamic effect of wave run-up to the storm water levels determined above and shown in Figure 2 (refer to Figure 2 for illustration of storm effects on lake water levels). The magnitude of wave run-up was determined by using a method based on the COE Shore Protection Manual (Reference 8). This method considered wind direction and speed, open water distance, near shore slope and its variation, and water depth at representative shoreline cross sections. Base flood elevations shown on the Flood Insurance Rate Map for Tuscarora Bay and the downstream portions of Twelvemile Creek and East Branch Twelvemile Creek reflect the still-water storm elevations on Lake Ontario, since shoreline topography in this area prevents the higher elevations caused by wave run-up.

Flood elevations in the town may be raised by debris blockage or ice jams during spring thaws; the hydraulic analyses for this study, however, are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed and do not fail.

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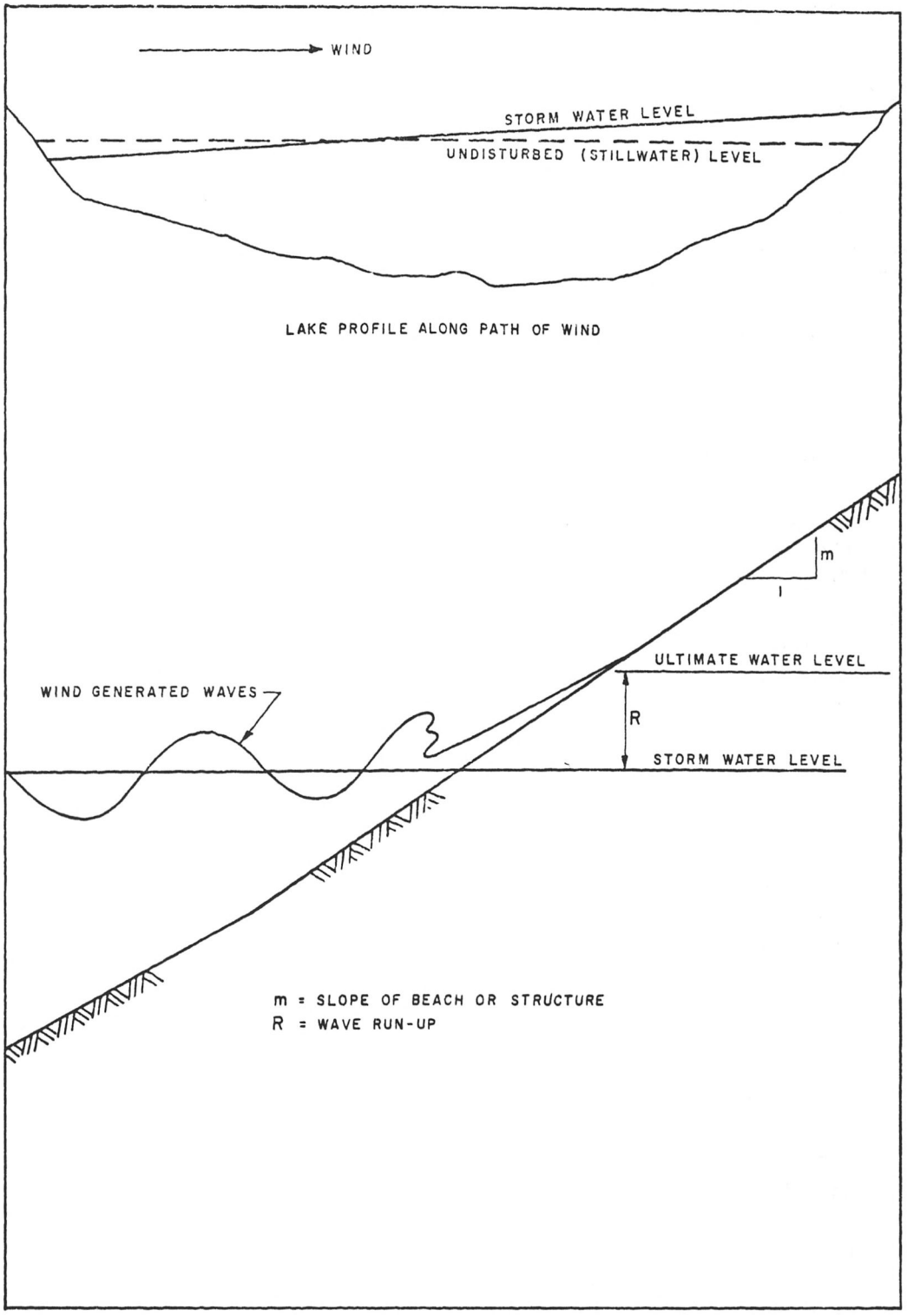

Figure 2 - Diagram of Storm Effects on Lake Water Levels

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Flood boundaries for approximate study areas were taken from the FIA Flood Hazard Boundary Maps (Reference 9).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management programs. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1"=200', with a contour interval of five feet (Reference 10). In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown. Approximate flood boundaries were taken from the FIA Flood Hazard Boundary Maps referenced above.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations, and therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain

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areas, that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

A floodway generally is not appropriate in areas such as those that may be inundated by flood waters from Lake Ontario. Thus, no floodway was prepared for the lower reaches of the East Branch of Twelvemile Creek, since flooding results from high levels of Lake Ontario rather than from high stream flow.

The floodway presented in this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

As shown on the Flood Boundary and Floodway Map (Exhibit 3) the floodway widths were determined at cross sections; between cross sections, widths were interpolated and boundaries drawn. In cases where the floodway and the 100-year boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 3.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the Town of Wilson.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek							
A	1,100	505	4,033	1.4	248.2[3]	247.2[3]	1.0
B	3,100	190	847	6.7	248.2[3]	247.3[3]	0.9
C	4,400	200	1,289	4.4	251.1	251.0	0.1
D	5,100	500	2,458	2.3	252.1	251.9	0.2
E	6,100	500	2,648	2.2	253.5	253.1	0.4
F	7,475	400	2,049	2.8	255.2	254.8	0.4
G	7,620	292	2,362	2.4	257.4	257.4	0.0
H	7,950	250	1,845	3.1	257.6	257.6	0.0
I	8,235	100[4]	856	6.7	257.9	257.8	0.1
J	8,380	98[4]	785	7.3	259.3	259.3	0.0
K	10,180	376	1,536	3.7	264.1	263.6	0.5
L	10,880	57	381	15.0	266.7	266.7	0.0
M	11,580	273	1,424	4.0	273.8	273.5	0.3
N	13,580	176	1,303	4.4	279.8	279.3	0.5
O	15,080	283	2,021	2.8	282.7	282.2	0.5
P	17,280	182	832	6.9	286.4	286.1	0.3

[1]FEET ABOVE MOUTH [2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS
[3]WATER-SURFACE ELEVATIONS DO NOT REFLECT THE BACKWATER EFFECT OR WAVE RUN-UP OF LAKE ONTARIO
[4]PART OF FLOODWAY LOCATED OUTSIDE OF CORPORATE LIMITS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek Continued							
Q	19,905	600	3,202	1.8	293.9	293.1	0.8
R	19,995	548	4,079	1.2	294.8	294.6	0.2
S	22,030	564	3,026	1.7	296.0	295.7	0.3
T	24,530	811	2,995	1.7	298.8	298.4	0.4
U	26,780	400	1,870	2.7	302.2	301.9	0.3
V	28,180	300	1,627	3.1	304.6	304.4	0.2
W	30,300	500	1,810	2.8	310.0	309.6	0.4
X	30,425	400	1,568	3.2	310.6	310.6	0.0
Y	33,480	400	1,882	2.7	319.6	318.8	0.8
Z	34,380	400	2,025	2.5	321.3	320.9	0.4
AA	34,580	305	2,001	2.5	322.1	321.8	0.3
AB	37,380	100	635	7.9	326.5	325.5	1.0
AC	37,490	60	480	10.5	328.3	328.3	0.0
AD	38,790	400	2,404	2.1	331.7	330.8	0.9
AE	41,890	250	1,439	3.5	336.9	336.8	0.1

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek							
A	1,100	505	4,033	1.4	248.2[3]	247.2[3]	1.0
B	3,100	190	847	6.7	248.2[3]	247.3[3]	0.9
C	4,400	200	1,289	4.4	251.1	251.0	0.1
D	5,100	500	2,458	2.3	252.1	251.9	0.2
E	6,100	500	2,648	2.2	253.5	253.1	0.4
F	7,475	400	2,049	2.8	255.2	254.8	0.4
G	7,620	292	2,362	2.4	257.4	257.4	0.0
H	7,950	250	1,845	3.1	257.6	257.6	0.0
I	8,235	100[4]	856	6.7	257.9	257.8	0.1
J	8,380	98[4]	785	7.3	259.3	259.3	0.0
K	10,180	376	1,536	3.7	264.1	263.6	0.5
L	10,880	57	381	15.0	266.7	266.7	0.0
M	11,580	273	1,424	4.0	273.8	273.5	0.3
N	13,580	176	1,303	4.4	279.8	279.3	0.5
O	15,080	283	2,021	2.8	282.7	282.2	0.5
P	17,280	182	832	6.9	286.4	286.1	0.3

[1] FEET ABOVE MOUTH [2] WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS
[3] WATER-SURFACE ELEVATIONS DO NOT REFLECT THE BACKWATER EFFECT OR WAVE RUN-UP OF LAKE ONTARIO
[4] PART OF FLOODWAY LOCATED OUTSIDE OF CORPORATE LIMITS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek Continued							
Q	19,905	600	3,202	1.8	293.9	293.1	0.8
R	19,995	548	4,079	1.2	294.8	294.6	0.2
S	22,030	564	3,026	1.7	296.0	295.7	0.3
T	24,530	811	2,995	1.7	298.8	298.4	0.4
U	26,780	400	1,870	2.7	302.2	301.9	0.3
V	28,180	300	1,627	3.1	304.6	304.4	0.2
W	30,300	500	1,810	2.8	310.0	309.6	0.4
X	30,425	400	1,568	3.2	310.6	310.6	0.0
Y	33,480	400	1,882	2.7	319.6	318.8	0.8
Z	34,380	400	2,025	2.5	321.3	320.9	0.4
AA	34,580	305	2,001	2.5	322.1	321.8	0.3
AB	37,380	100	635	7.9	326.5	325.5	1.0
AC	37,490	60	480	10.5	328.3	328.3	0.0
AD	38,790	400	2,404	2.1	331.7	330.8	0.9
AE	41,890	250	1,439	3.5	336.9	336.8	0.1

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek							
A	1,100	505	4,033	1.4	248.2[3]	247.2[3]	1.0
B	3,100	190	847	6.7	248.2[3]	247.3[3]	0.9
C	4,400	200	1,289	4.4	251.1	251.0	0.1
D	5,100	500	2,458	2.3	252.1	251.9	0.2
E	6,100	500	2,648	2.2	253.5	253.1	0.4
F	7,475	400	2,049	2.8	255.2	254.8	0.4
G	7,620	292	2,362	2.4	257.4	257.4	0.0
H	7,950	250	1,845	3.1	257.6	257.6	0.0
I	8,235	100[4]	856	6.7	257.9	257.8	0.1
J	8,380	98[4]	785	7.3	259.3	259.3	0.0
K	10,180	376	1,536	3.7	264.1	263.6	0.5
L	10,880	57	381	15.0	266.7	266.7	0.0
M	11,580	273	1,424	4.0	273.8	273.5	0.3
N	13,580	176	1,303	4.4	279.8	279.3	0.5
O	15,080	283	2,021	2.8	282.7	282.2	0.5
P	17,280	182	832	6.9	286.4	286.1	0.3

[1] FEET ABOVE MOUTH [2] WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS
[3] WATER-SURFACE ELEVATIONS DO NOT REFLECT THE BACKWATER EFFECT OR WAVE RUN-UP OF LAKE ONTARIO
[4] PART OF FLOODWAY LOCATED OUTSIDE OF CORPORATE LIMITS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek Continued							
Q	19,905	600	3,202	1.8	293.9	293.1	0.8
R	19,995	548	4,079	1.2	294.8	294.6	0.2
S	22,030	564	3,026	1.7	296.0	295.7	0.3
T	24,530	811	2,995	1.7	298.8	298.4	0.4
U	26,780	400	1,870	2.7	302.2	301.9	0.3
V	28,180	300	1,627	3.1	304.6	304.4	0.2
W	30,300	500	1,810	2.8	310.0	309.6	0.4
X	30,425	400	1,568	3.2	310.6	310.6	0.0
Y	33,480	400	1,882	2.7	319.6	318.8	0.8
Z	34,380	400	2,025	2.5	321.3	320.9	0.4
AA	34,580	305	2,001	2.5	322.1	321.8	0.3
AB	37,380	100	635	7.9	326.5	325.5	1.0
AC	37,490	60	480	10.5	328.3	328.3	0.0
AD	38,790	400	2,404	2.1	331.7	330.8	0.9
AE	41,890	250	1,439	3.5	336.9	336.8	0.1

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek Continued							
AF	42,040	140	1,165	4.3	339.0	339.0	0.0
AG	42,990	79	743	6.8	340.8	340.3	0.5
AH	45,890	1,220	5,272	0.9	345.4	344.4	1.0
AI	48,090	175	1,185	4.2	347.3	346.5	0.8
AJ	49,490	1,500	5,564	0.8	349.8	348.9	0.9
AK	51,190	262	1,194	3.6	351.0	350.4	0.6
AL	53,690	900	3,994	1.1	354.8	354.2	0.6
AM	53,840	701	3,539	1.2	356.1	355.5	0.6
AN	55,340	1,267	4,829	0.9	359.2	358.9	0.3
AO	56,840	1,416	4,469	1.0	360.1	359.5	0.6
AP	59,340	457	2,053	2.1	362.3	361.4	0.9
AQ	59,500	694	3,405	1.3	362.9	362.8	0.1
AR	60,850	143	1,115	3.9	363.5	363.2	0.3
AS	62,450	1,608	7,053	0.6	365.1	364.4	0.7
AT	63,900	641	2,911	1.2	365.5	364.7	0.8

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
East Branch Twelvemile Creek Continued							
AU	64,030	734	3,718	0.9	365.8	365.5	0.3
AV	64,980	676	2,939	1.1	366.2	365.8	0.4
AW	67,380	1,329	5,135	0.6	367.5	366.8	0.7
AX	69,980	755	3,587	0.9	369.7	368.9	0.8
AY	71,280	1,726	5,843	0.5	370.4	369.5	0.9
Tributary East of East Branch Twelvemile Creek							
A	2,000	170	644	1.1	365.4	364.4	1.0
B	2,130	463	1,563	0.4	365.8	365.7	0.1
C	4,030	415	1,096	0.6	366.5	366.1	0.4
D	5,030	462	796	0.8	367.4	366.6	0.8
E	5,140	436	935	0.7	368.6	368.6	0.0

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

EAST BRANCH TWELVEMILE CREEK AND
TRIBUTARY EAST OF EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Tributary South of East Branch Twelvemile Creek							
A	1,130	258	1,420	0.3	367.1	366.1	1.0
B	2,430	1,410	4,757	0.1	367.1	366.1	1.0
C	3,930	1,810	6,815	0.1	367.1	366.1	1.0
D	4,530	293	1,100	0.3	367.1	366.1	1.0
E	5,030	864	3,133	0.1	367.1	366.1	1.0
Twelvemile Creek							
A	300	320	2,225	2.5	251.8	251.7	0.1
B	670	316	2,434	2.3	251.9	251.8	0.1
C	1,730	234	2,045	2.7	252.2	252.1	0.1
D	1,860	245	1,837	3.0	252.3	252.2	0.1
E	2,660	354	1,989	2.8	252.7	252.6	0.1
F	3,410	262	1,707	3.2	253.0	253.0	0.0
G	4,760	224	1,591	3.5	253.9	253.9	0.0
H	5,990	229	1,621	3.4	254.7	254.7	0.0

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

TRIBUTARY SOUTH OF EAST BRANCH TWELVEMILE CREEK AND TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Twelvemile Creek Continued							
I	7,890	180	1,359	4.1	256.0	256.0	0.0
J	9,740	244	1,499	3.7	258.0	258.0	0.0
K	10,890	150	1,245	4.4	260.5	260.4	0.1
L	12,350	200	1,350	4.1	264.8	264.2	0.6
M	13,470	200	1,578	3.5	268.1	268.0	0.1
N	15,070	82	842	6.5	271.2	271.0	0.2
O	15,280	450	2,666	2.1	273.0	272.8	0.2
P	17,480	207	850	6.5	275.4	275.3	0.1
Q	19,930	281	1,631	2.7	283.2	282.7	0.5
R	22,080	155	1,397	3.1	285.2	284.5	0.7
S	23,100	201	956	4.6	286.3	285.6	0.7
T	25,500	300	1,548	2.8	290.4	290.0	0.4
U	26,350	66	589	7.4	291.7	291.0	0.7
V	26,500	300	2,300	1.9	293.2	292.7	0.5
W	28,480	300	2,369	1.8	294.2	293.8	0.4
X	31,660	200	1,362	3.2	296.9	296.6	0.3

[1]FEET ABOVE MOUTH
[2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

TWELVEMILE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION[2]		
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE (FT.)
Twelvemile Creek Continued							
Y	34,160	330	2,182	2.0	299.9	299.6	0.3
Z	37,800	350	2,551	1.7	302.2	301.8	0.4

[1]FEET ABOVE MOUTH [2]WATER-SURFACE ELEVATIONS WITHOUT CONSIDERING ICE JAM EFFECTS

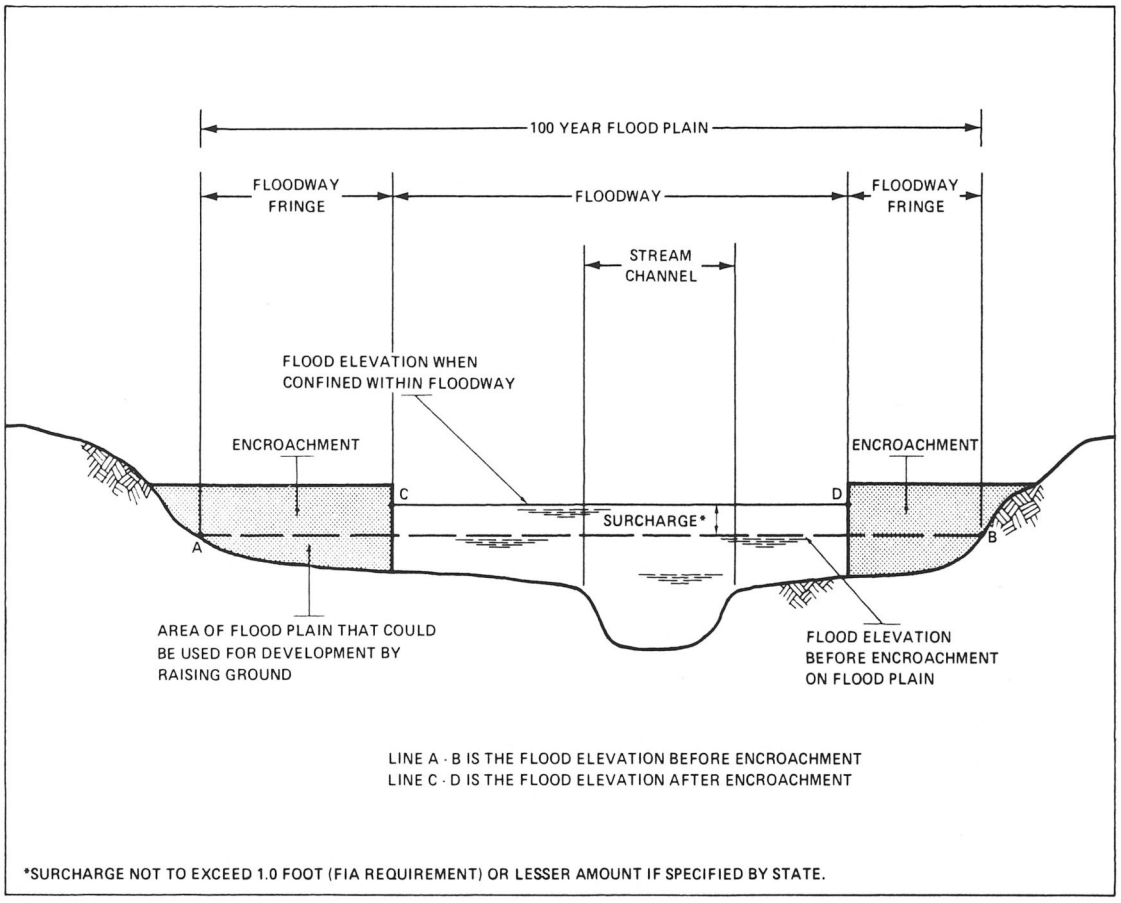
TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOODWAY DATA

TWELVEMILE CREEK



FLOODWAY SCHEMATIC Figure 3

surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Eight reaches meeting the above criteria were required for the flooding sources of the Town of Wilson. These included five on East Branch Twelvemile Creek, one on Twelvemile Creek, one on the Tributaries East and South of East Branch Twelvemile Creek, and one along the Lake Ontario shoreline. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

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5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damages from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Town of Wilson was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1, A2, A3, A4:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; and areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

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Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Wilson is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

In 1975 the COE published 100-year flood elevations for the Lake Ontario shoreline (Reference 6). These elevations were based on a statistical analysis of gage levels adjusted to reflect present diversion and outlet conditions. Comparison of the results of this study's analysis of the raw gage data with the flood levels presented by the COE resulted in no significant differences; therefore, the 100-year open-coast flood levels developed by the COE were adopted for use in this study.

This study is coordinated with the Flood Insurance Study being prepared for the Village of Wilson.

This study is authoritative for the purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, 26 Federal Plaza, New York, New York 10007.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
East Branch Twelvemile Creek							
Reach 1	01	-1.63	-0.46	+1.17	015	A3	Varies
Reach 2	01,03	-1.01	-0.27	+0.67	010	A2	Varies
Reach 3	03	-1.77	-0.51	+1.13	020	A4	Varies
Reach 4	03,04	-1.24	-0.35	+0.89	010	A2	Varies
Tributary East of East Branch Twelvemile Creek							
Reach 1	04	-1.22	-0.31	+0.67	010	A2	364
Reach 2	04	-0.41	-0.08	+0.29	005	A1	Varies
Tributary South of East Branch Twelvemile Creek							
Reach 1	04	-1.14	-0.30	+0.72	010	A2	364

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT – SEE MAP

TABLE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOOD INSURANCE ZONE DATA

EAST BRANCH TWELVEMILE CREEK, TRIBUTARY EAST OF EAST BRANCH TWELVEMILE CREEK, TRIBUTARY SOUTH OF EAST BRANCH TWELVEMILE CREEK

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Tributary South of East Branch Twelvemile Creek Continued							
Reach 2	04	-0.40	-0.07	+0.22	005	A1	366
Twelvemile Creek							
Reach 1	01,03	-1.98	-0.50	+1.40	020	A4	Varies
Lake Ontario							
Reach 1	01,02	-0.7	-0.2	+0.4	005	A1	Varies[4]

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT – SEE MAP
[4] INCLUDES WAVE RUN-UP

TABLE 4

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

TOWN OF WILSON, NY
(NIAGARA CO.)

FLOOD INSURANCE ZONE DATA

TRIBUTARY SOUTH OF EAST BRANCH
TWELVEMILE CREEK AND LAKE ONTARIO

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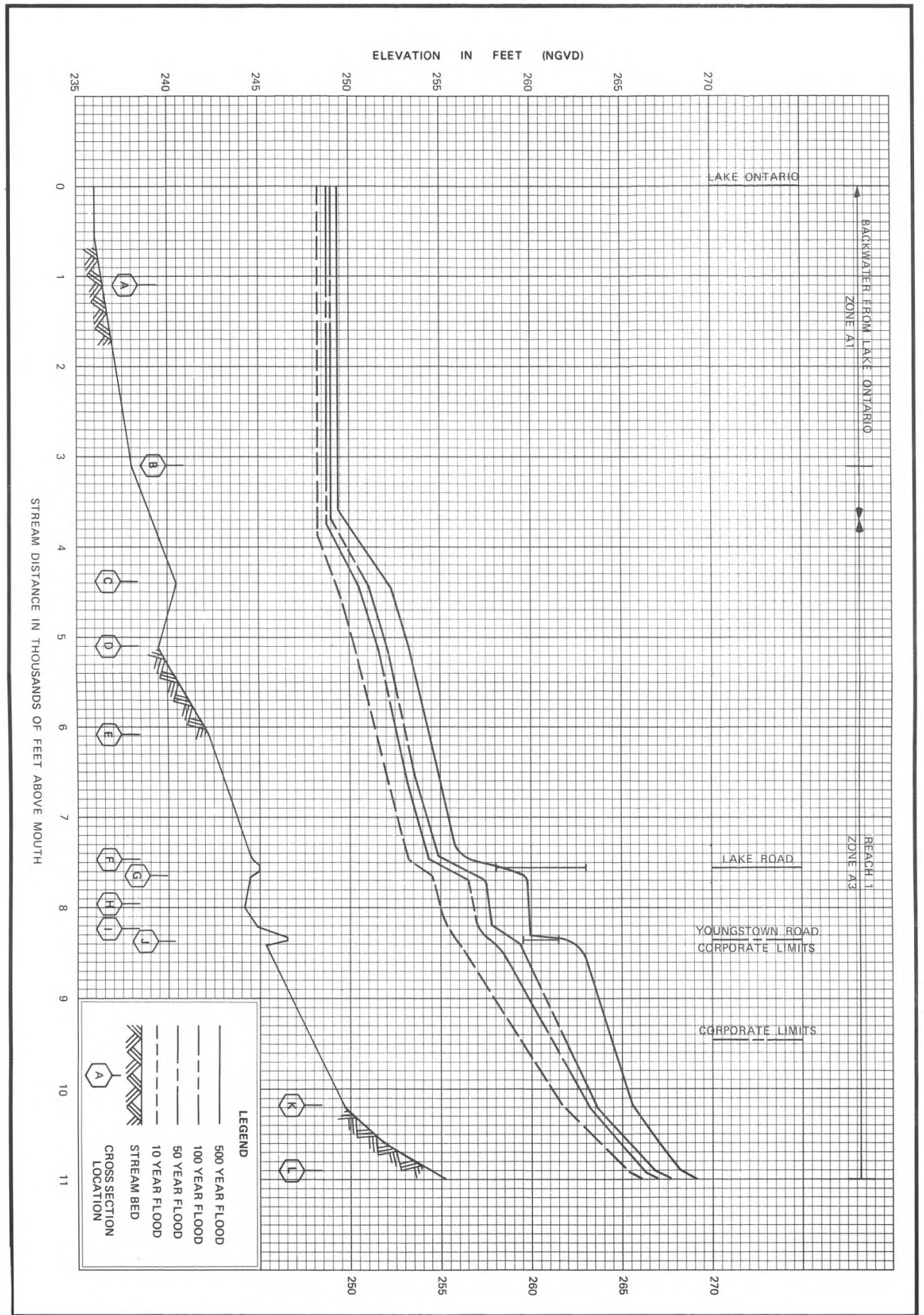

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Federal Insurance Administration

TOWN OF WILSON, NY
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FLOOD PROFILES

EAST BRANCH TWELVEMILE CREEK

01P

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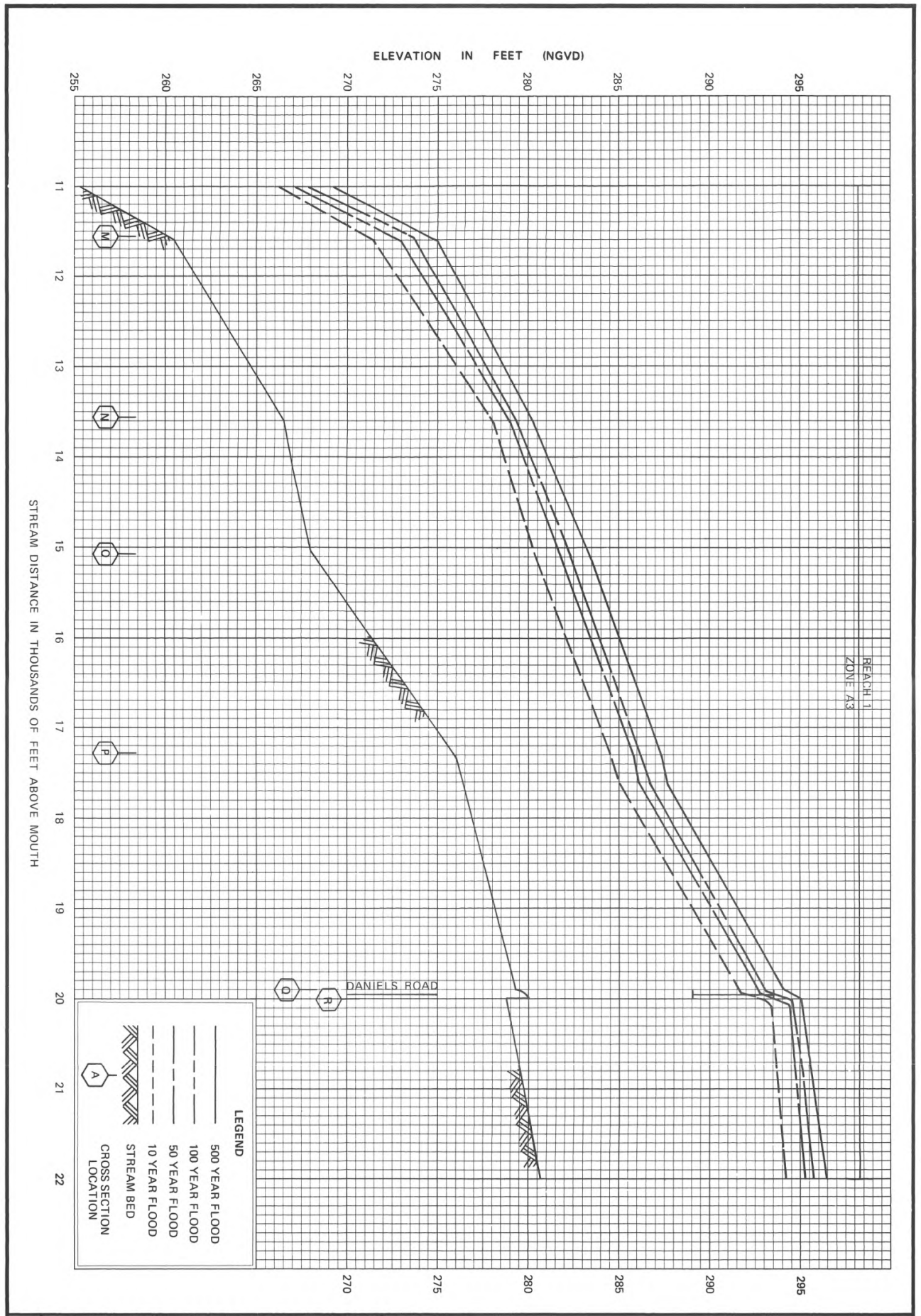

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TOWN OF WILSON, NY
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FLOOD PROFILES

EAST BRANCH TWELVEMILE CREEK

02P

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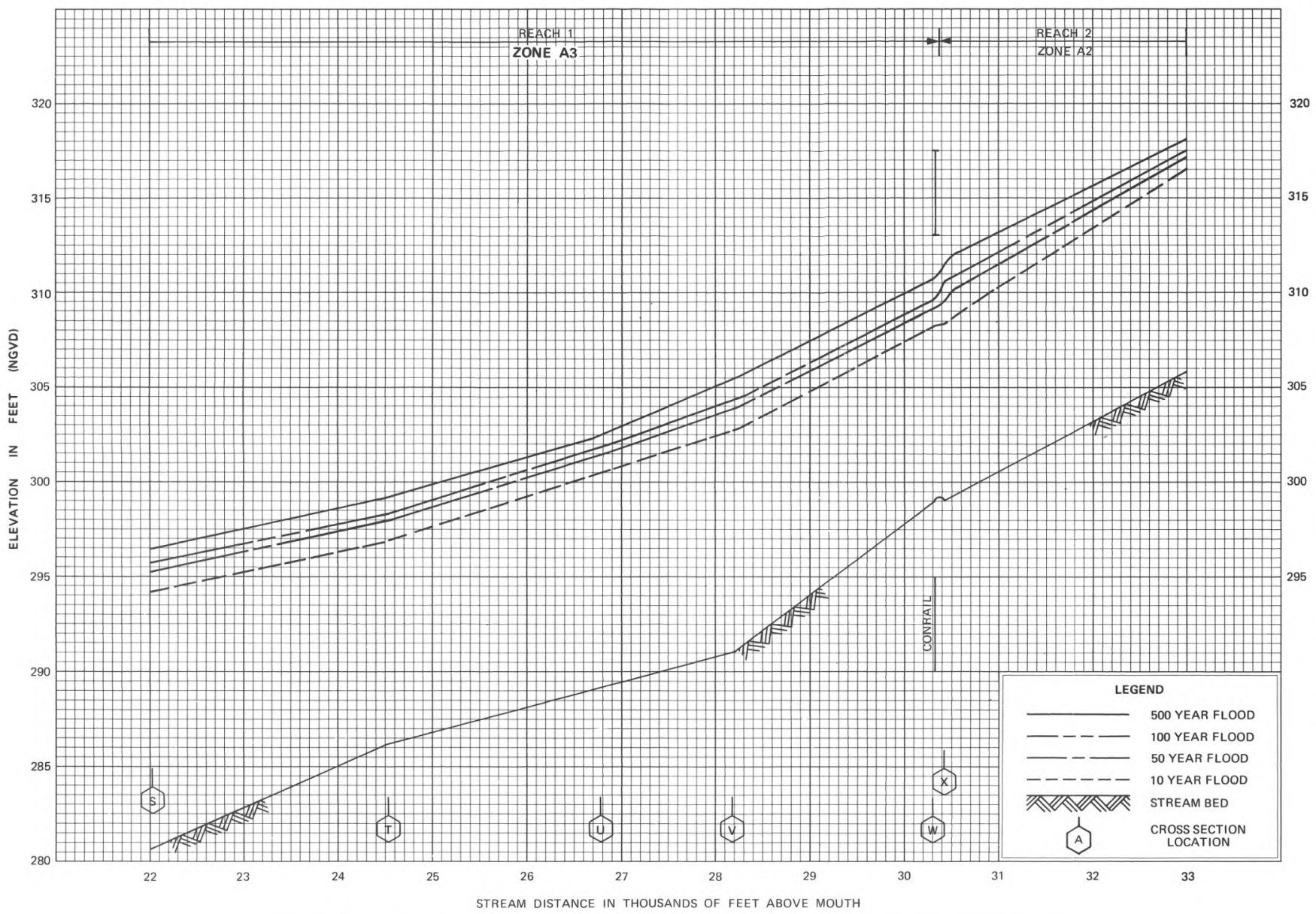

FLOOD PROFILES

EAST BRANCH TWELVEMILE CREEK

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03P

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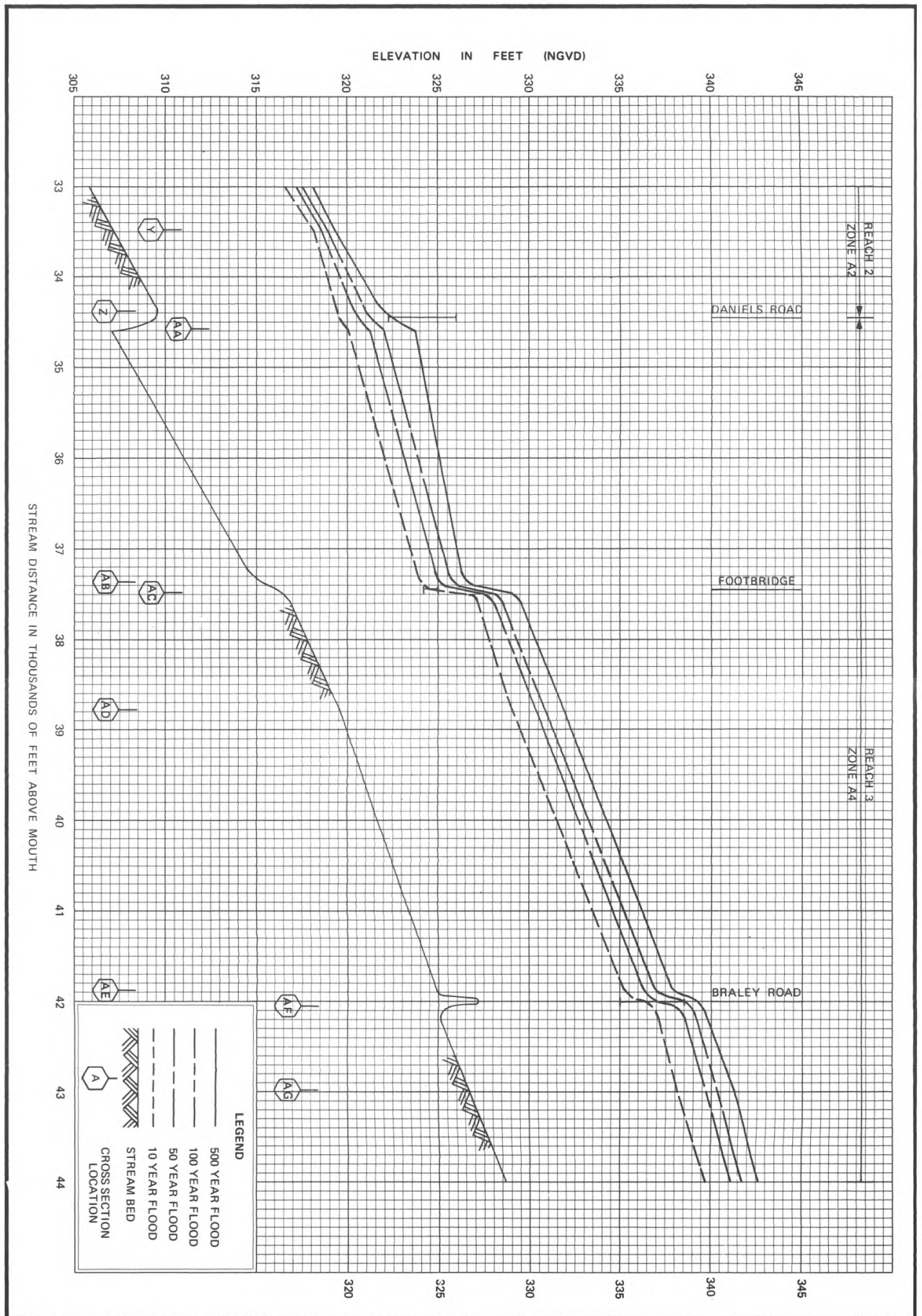

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FLOOD PROFILES

EAST BRANCH TWELVEMILE CREEK

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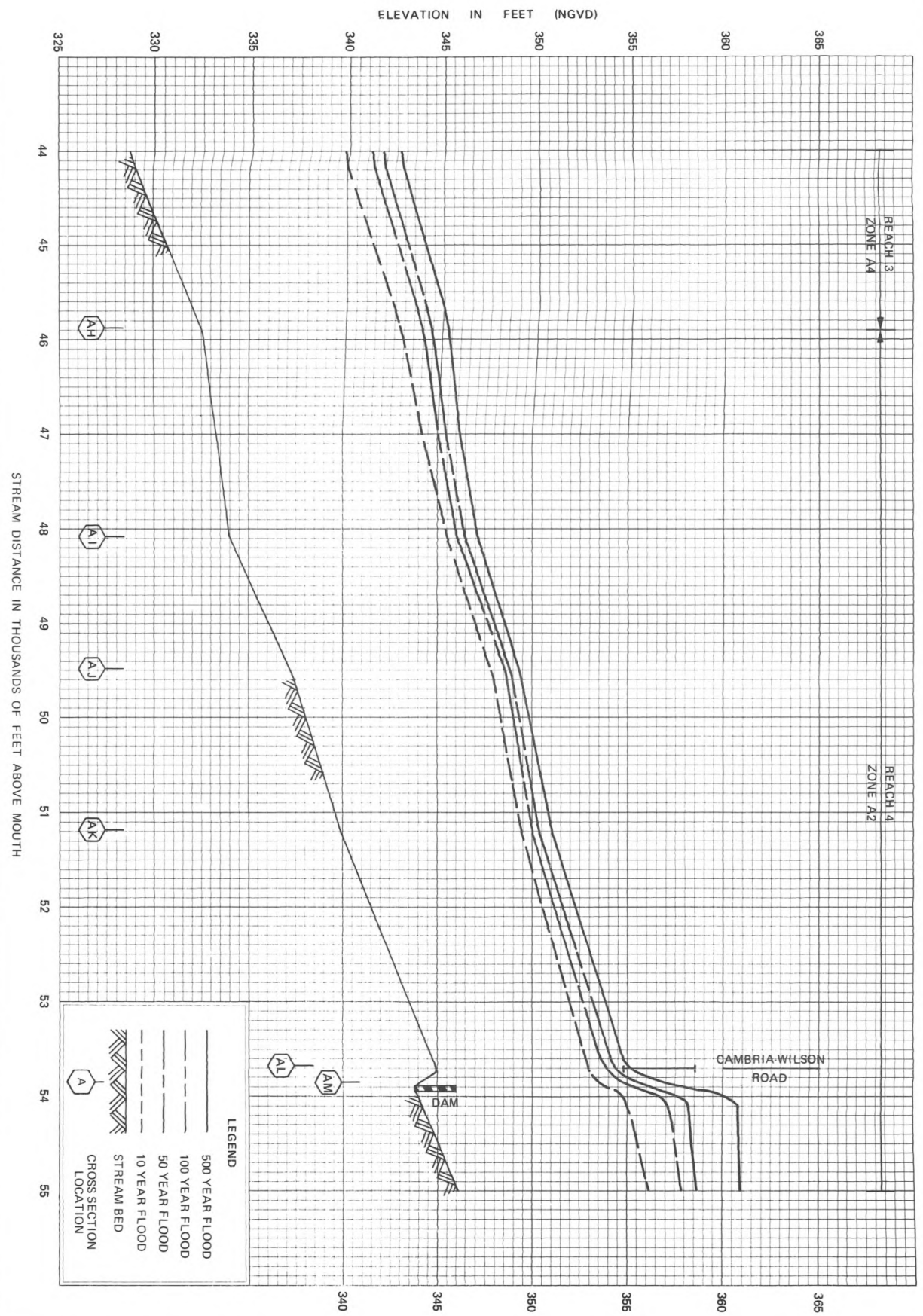

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TOWN OF WILSON, NY
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FLOOD PROFILES

EAST BRANCH TWELVEMILE CREEK

05P

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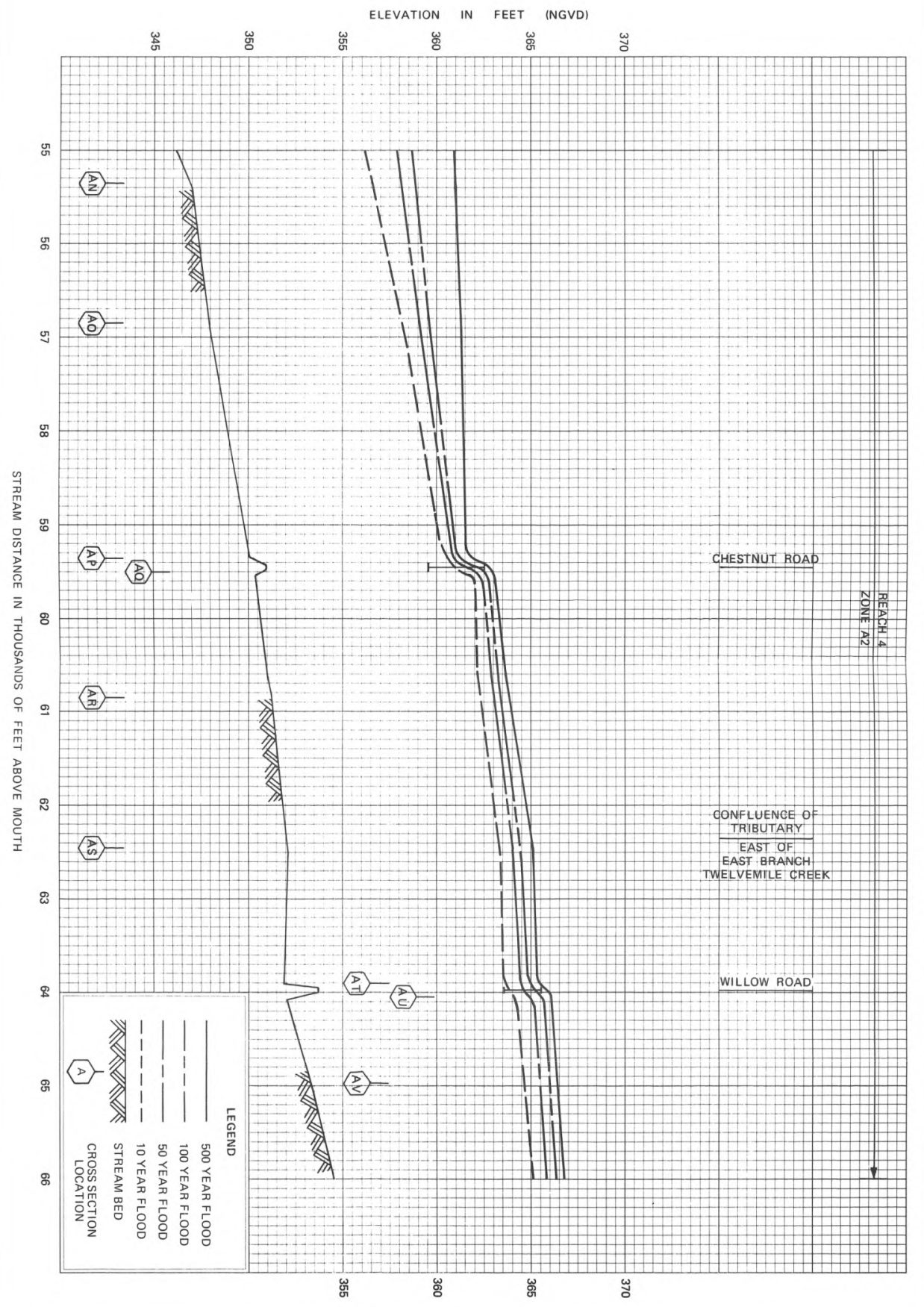

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EAST BRANCH TWELVEMILE CREEK

06P

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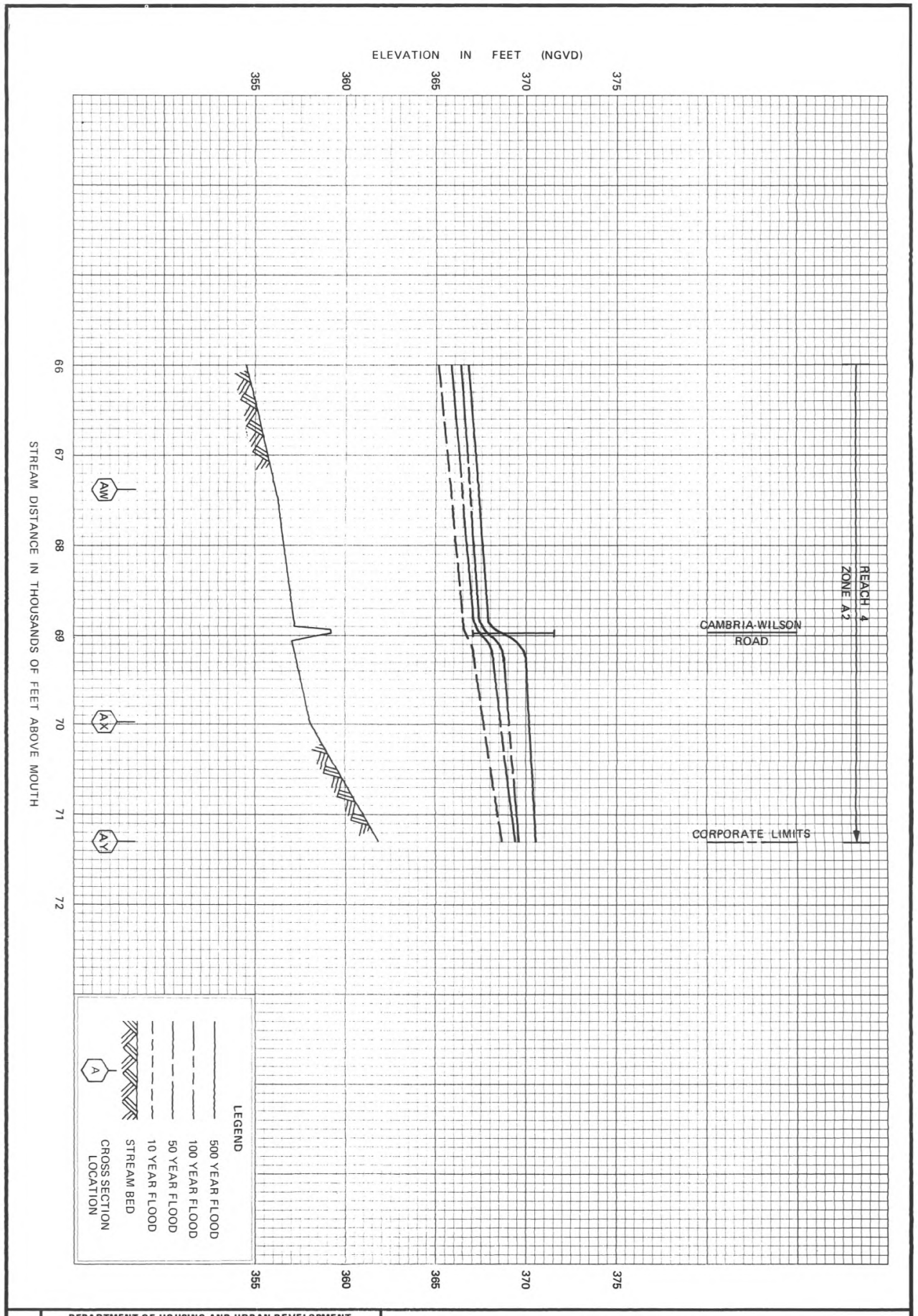

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EAST BRANCH TWELVEMILE CREEK

07P

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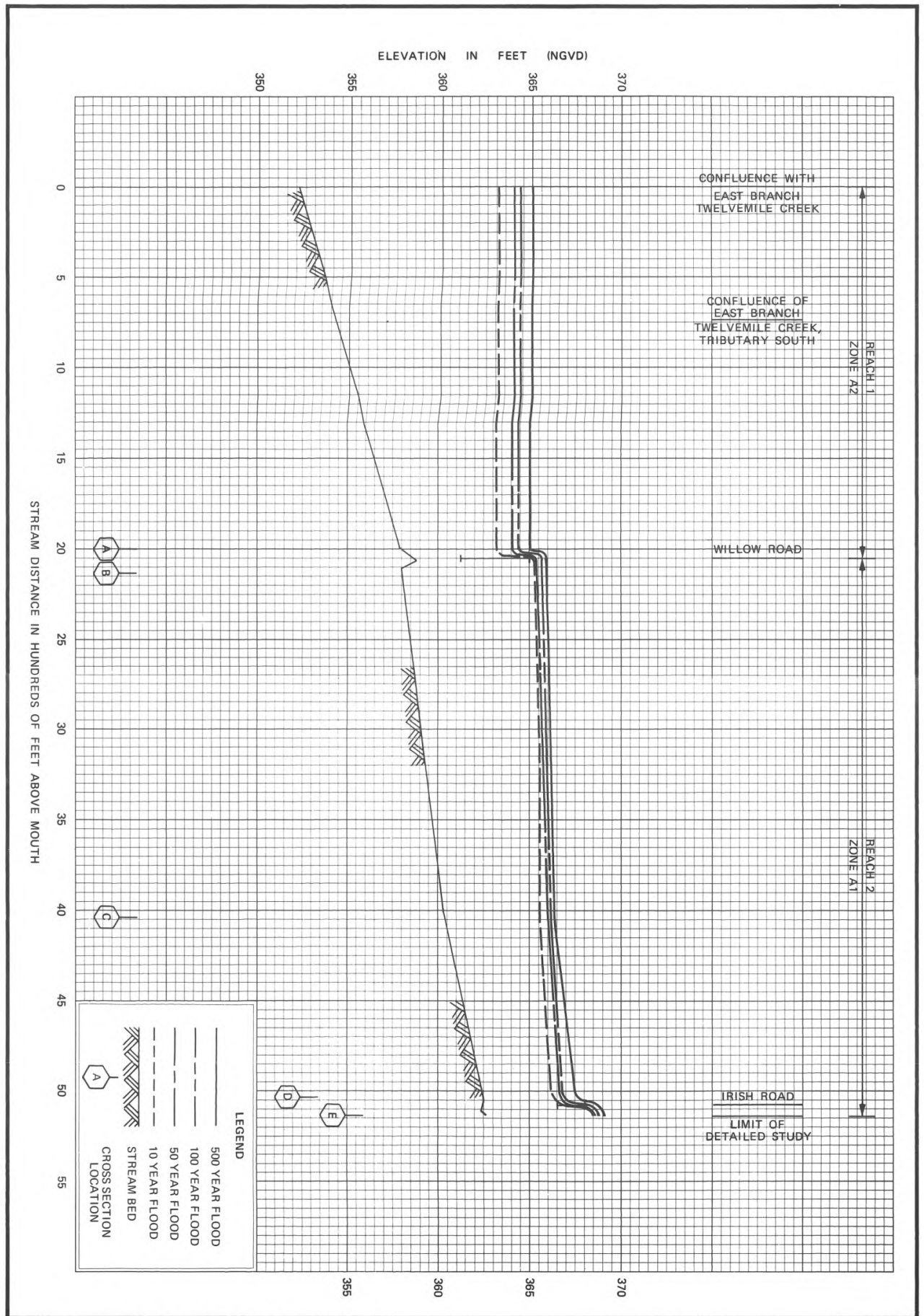

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TOWN OF WILSON, NY
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FLOOD PROFILES

TRIBUTARY EAST OF EAST BRANCH TWELVEMILE CREEK

08P

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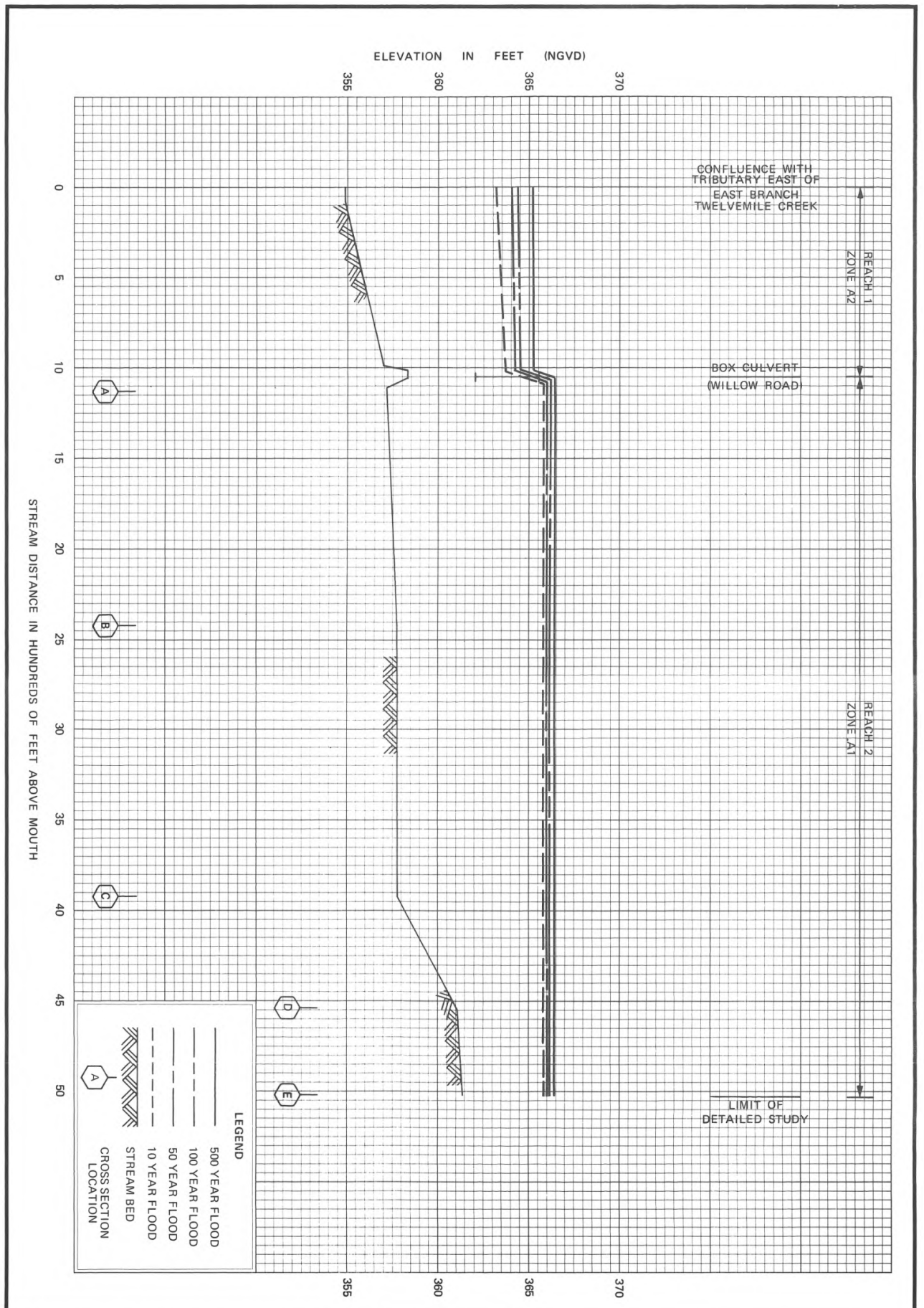

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TOWN OF WILSON, NY
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FLOOD PROFILES

TRIBUTARY SOUTH OF EAST BRANCH TWELVEMILE CREEK

09P

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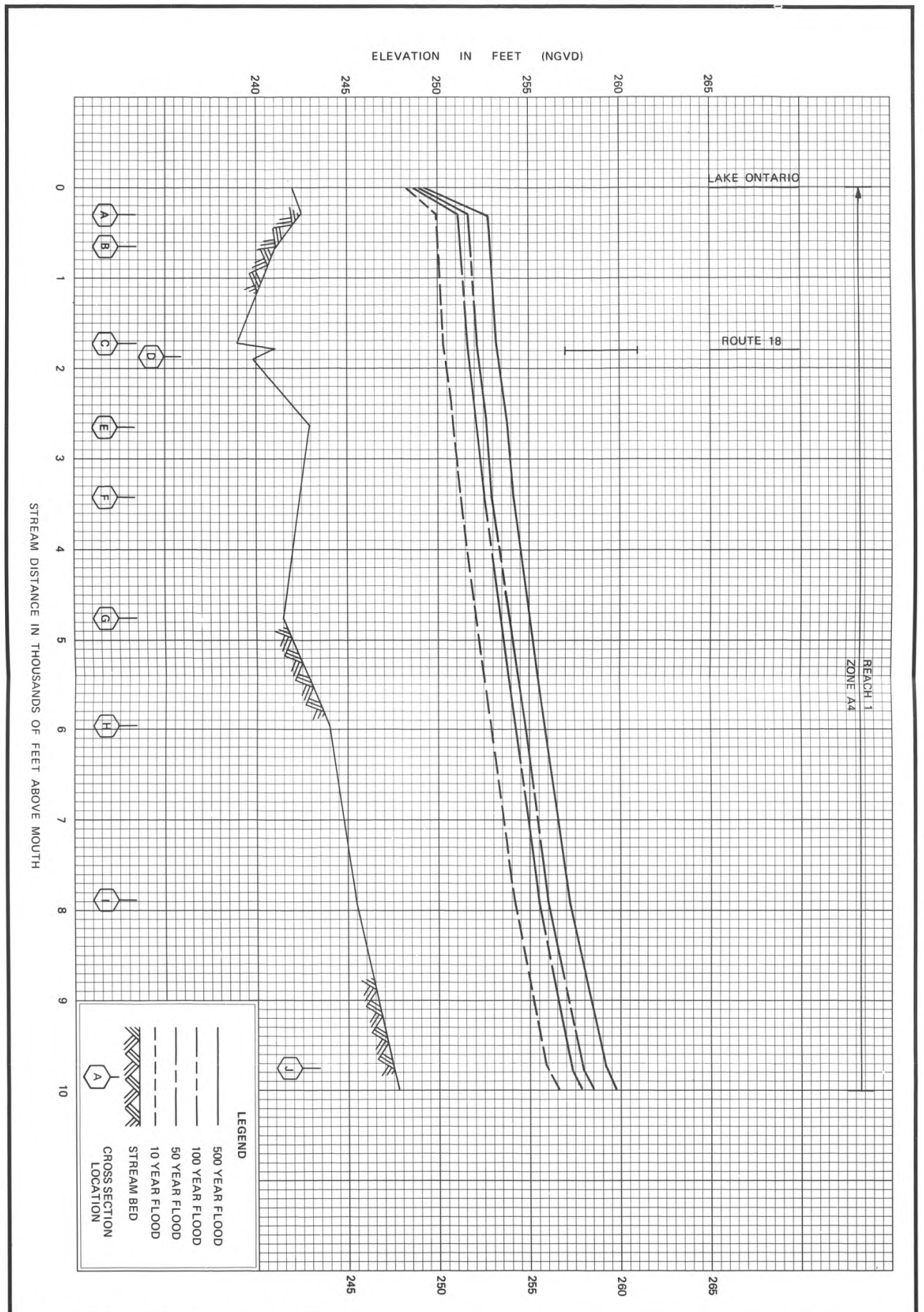

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TOWN OF WILSON, NY
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FLOOD PROFILES

TWELVEMILE CREEK

10P

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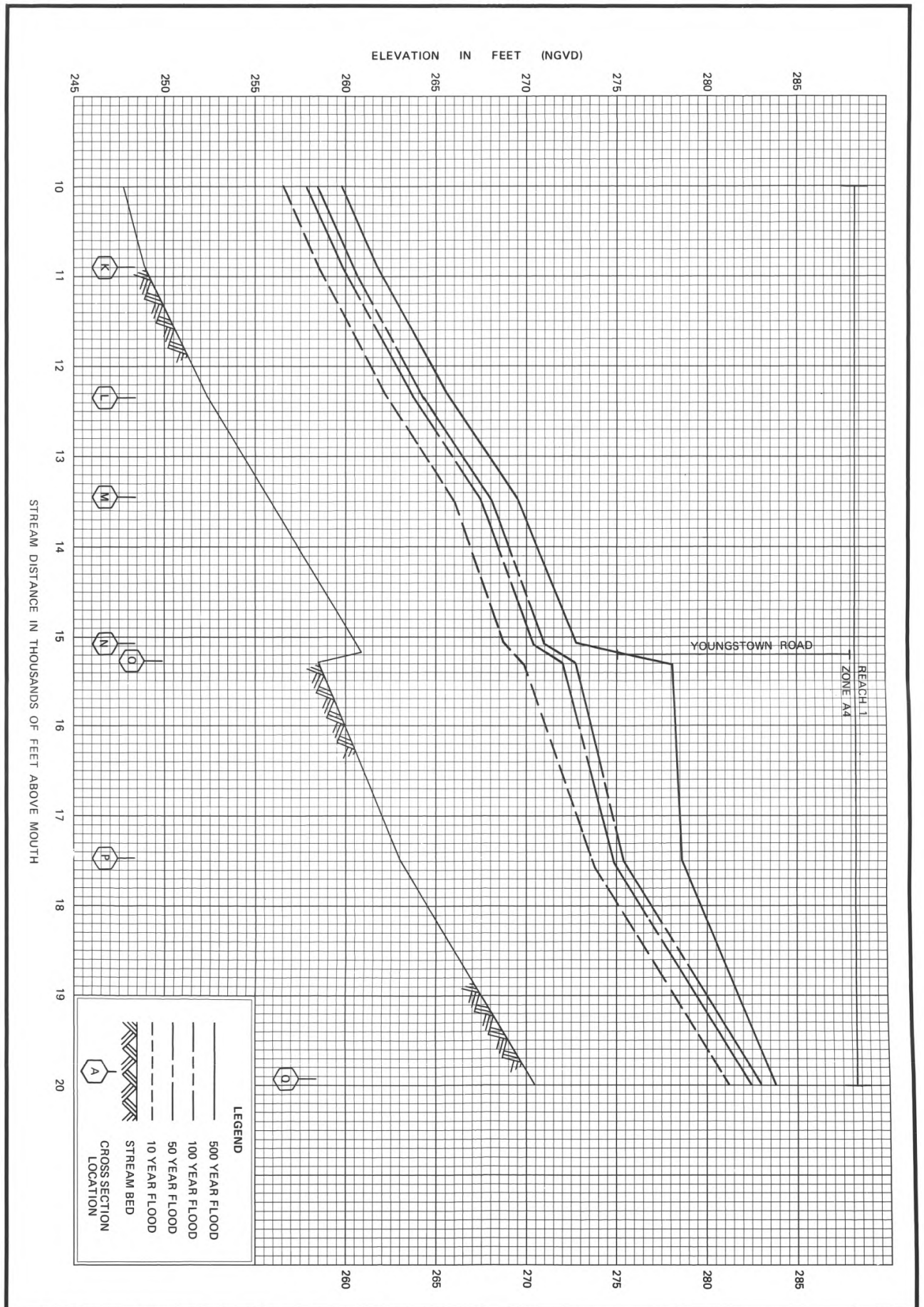

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TOWN OF WILSON, NY
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FLOOD PROFILES

TWELVEMILE CREEK

11P

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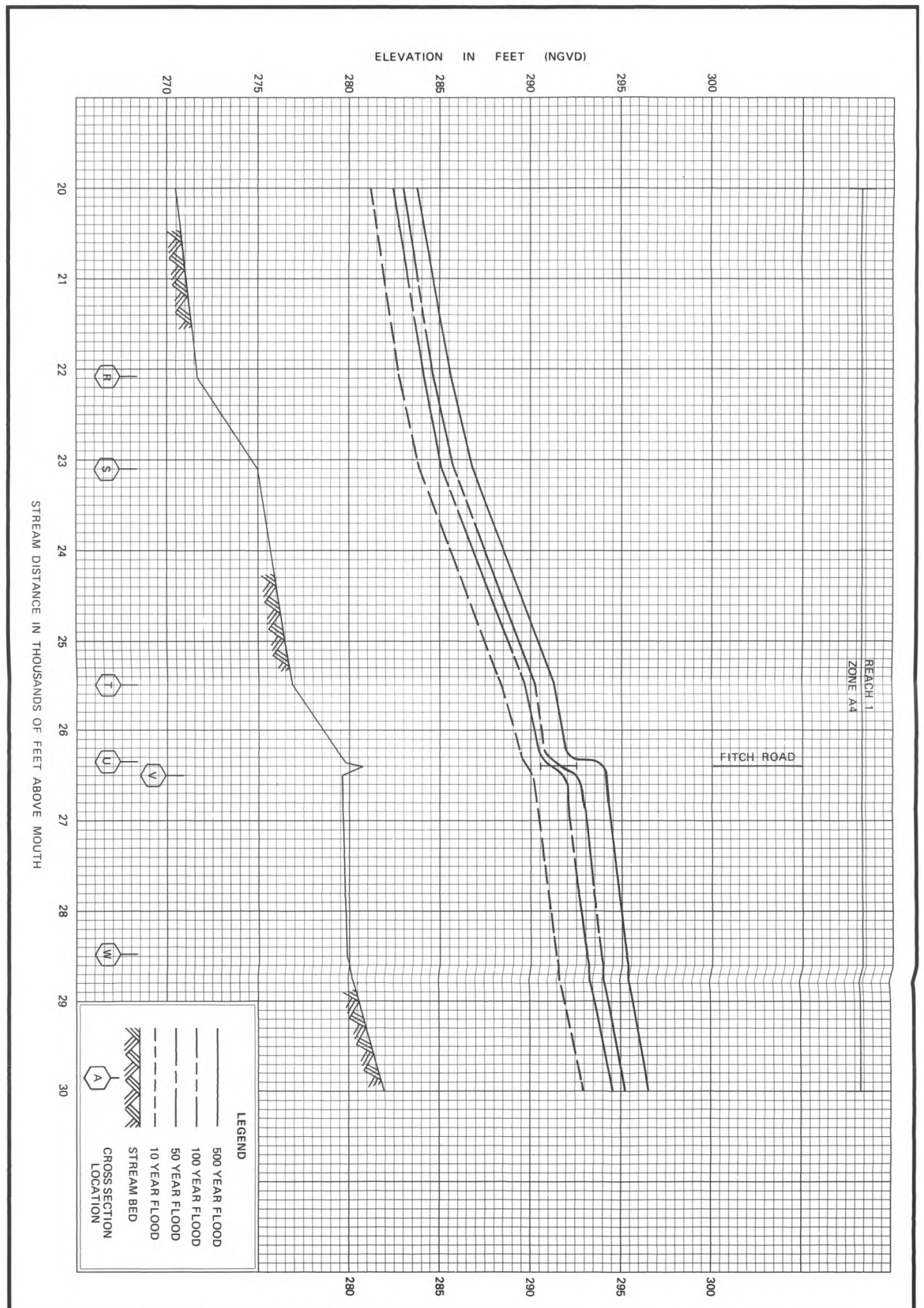

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TOWN OF WILSON, NY
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FLOOD PROFILES

TWELVEMILE CREEK

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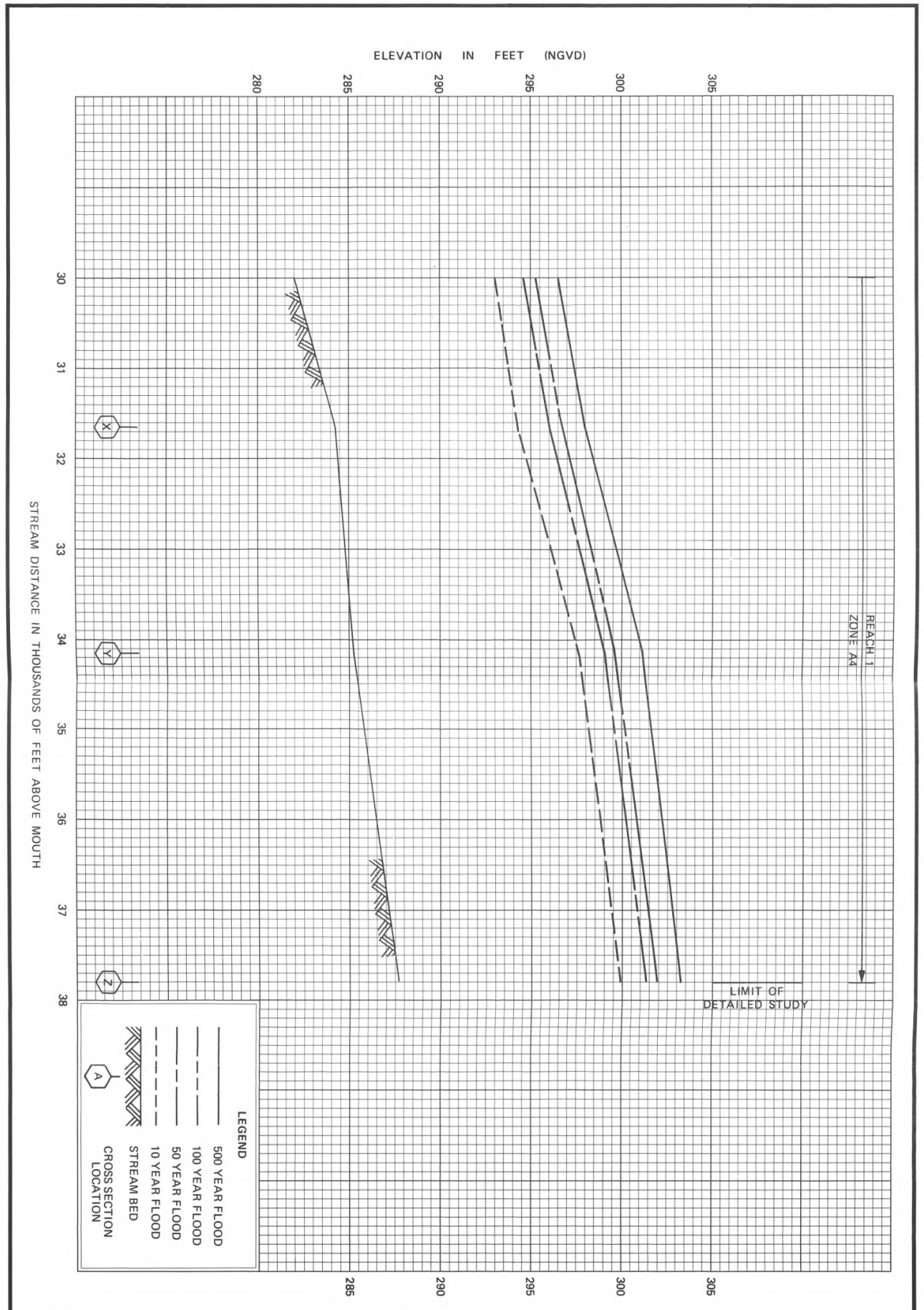

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TOWN OF WILSON, NY
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FLOOD PROFILES

TWELVEMILE CREEK

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